



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/608,152	06/30/2003	Hakansson Bo	1275	8148

7590 11/13/2006

DAVID J. SERBIN
LAW OFFICE OF DAVID J. SERBIN
1217 KING STREET
ALEXANDRIA, VA 22314

EXAMINER

WILKINS III, HARRY D

ART UNIT	PAPER NUMBER
----------	--------------

1742

DATE MAILED: 11/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/608,152

Applicant(s)

BO ET AL.

Examiner

Harry D. Wilkins, III

Art Unit

1742

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 October 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 and 23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 and 23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10 October 2005 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-12 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wanngard (US 5,419,818) in view of Juda (US 3,124,520).

Wanngard teaches (see col. 1, lines 18-37, col. 3, line 34 to col. 4, line 44 and col 6, lines 9-64) a process for producing alkali metal chlorate in an electrolytic cell (4) including electrolyzing the electrolyte solution and transferring the electrolyzed solution to a chlorate reactor (5).

Wanngard teach that the electrolytic cell (4) is an undivided electrolytic cell. In this process, the electrolyte fed to the cell included NaCl. This was electrolyzed to form Cl₂ gas at the anode and NaOH at the cathode. The Cl₂ was immediately hydrolyzed

Art Unit: 1742

into HClO and HCl (Wanngard at col. 3, lines 59-68). The HClO is then reacted in the chlorate reactor to form sodium chlorate (NaClO_3).

Thus, Wanngard fails to teach the claimed cell which was divided by a cation selective membrane.

Juda teach (see figures 2, col. 5, lines 13-42 and col. 7, line 26 to col. 8, line 17) a cell divided by a cation exchange membrane into anode and cathode compartments, with a gas diffusion cathode. The process included introducing a sodium chloride solution into the anode chamber and an oxygen-containing gas into the cathode chamber, electrolyzing the solution to produce chlorine gas dissolved in the water (i.e.- electrolyzed solution) in the anolyte chamber and sodium hydroxide in the catholyte chamber. The advantage of using the divided cell with oxygen gas diffusion cathode was to prevent chloride ions transferring to the catholyte and also increasing current efficiency. One of ordinary skill in the art would also have immediately realized the additional advantage that the reaction products (anions) produced at the anode would have been prevented from reaching the cathode, thereby avoiding undesirable side reactions.

Therefore, it would have been obvious to one of ordinary skill in the art to have used the divided electrolysis cell as taught by Juda for the undivided electrolysis cell taught by Wanngard because of increased current efficiency and the prevention of product anions at the anode from reacting at the cathode.

It is noted that the overall reaction provided by the process cell of Juda is identical to the reaction provided by the process of Wanngard. Both cells react an

Art Unit: 1742

incoming NaCl solution to produce a NaOH solution at the cathode and Cl_2 gas at the anode, which immediately dissolves into the solvent (water) to form HClO and HCl. Therefore, one of ordinary skill in the art would have had a reasonable expectation of successfully substituting the divided cell of Juda for the cell of Wanngard.

Regarding claim 2, Juda teaches (as above) that the gas diffusion electrode divided the cathode compartment into a gas chamber (29) on one side of the gas diffusion electrode and an alkali metal hydroxide chamber (15) on the other side thereof. An alkali metal solution was introduced to the alkali metal hydroxide chamber at 21 and an oxygen containing gas was introduced to the gas chamber at 27 (not numbered in figure 2, but equivalent to 11).

Regarding claim 3, Juda teaches (as above) using a cation selective membrane.

Regarding claims 4-6 and 11, Wanngard teaches (see cols. 3-4) using a pH of the solution of 5.0-7.5, a chloride concentration of 30-200 g/l, a chlorate concentration of 300-650 g/l and a temperature of 40-100°C.

Regarding claim 7, Wanngard does not teach the claimed concentration of chlorate. However, it would have been obvious to one of ordinary skill in the art to have optimized the concentration of the chlorate being fed to the electrolyzer in order to maximize current efficiency and achieve optimum production rate for chlorate.

Regarding claim 8, Wanngard teaches (see col. 7, lines 5-8) using a minor addition of sodium chromate. It would have been obvious to one of ordinary skill in the art to have optimized the amount of chromate used.

Regarding claim 9, Juda teaches the electrolysis without the use of chromate.

Art Unit: 1742

Regarding claim 10, since Wanngard does not teach a divided cell, there is no disclosed concentration of sodium hydroxide. However, it would have been obvious to one of ordinary skill in the art to have optimized the concentration of the hydroxide being produced in the electrolyzer in order to achieve proper reaction rate.

Regarding claim 12, Wanngard teaches feeding sodium hydroxide to the chlorate reactor.

Regarding claim 23, the cell of Juda included (see figure 2) a gas diffusion electrode (25) which divided the cathode compartment into a gas chamber (29) on one side of the gas diffusion electrode and an alkali metal hydroxide chamber (17) on the other side between the gas diffusion electrode and the cation selective separator. The process of Juda included (see cols. 7-8) introducing a weak alkali metal hydroxide solution into the alkali metal hydroxide chamber and oxygen containing gas into the gas chamber. The cation selective separator was a membrane. Wanngard teaches (see cols. 3-4) using a pH of the solution of 5.0-7.5.

Response to Arguments

4. Applicant's arguments filed 10 October 2006 have been fully considered but they are not persuasive. Applicant has argued that the objective of Juda is not primarily to produce alkali metal chlorate, and, hence, it would not be obvious to one of ordinary skill in the art to combine Juda with Wanngard to arrive at the presently claimed invention.

In response, the teachings of Juda with respect to using a cation selective membrane would apply equally to any similar cell for performing similar reactions. The advantage of preventing products formed at the anode (e.g.-chlorine gas) from

Art Unit: 1742

migrating to the cathode, where the products formed at the anode could participate in undesirable side reactions, would have been recognized by one of ordinary skill in the art to be quite well suited to be used in combination with the electrolytic process of Wanngard.

5. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

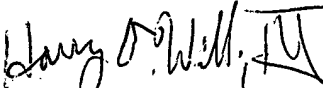
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry D. Wilkins, III whose telephone number is 571-272-1251. The examiner can normally be reached on M-F 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V. King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1742

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Harry D Wilkins, III
Primary Examiner
Art Unit 1742

hdw